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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER

WU, YICUN

ART UNIT	PAPER NUMBER
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2175

DATE MAILED: 05/20/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/043,764

Applicant(s)

NEHRU ET AL.

Examiner

Yicun Wu

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 22 April 2004.  
2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-9 and 12-14 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1-8, 12-14 is/are rejected.  
7) ☒ Claim(s) 9 is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

DIANE D. MIZRAHI  
PRIMARY PATENT EXAMINER  
TECHNOLOGY CENTER 21

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date 5.  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_.

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### III. DETAILED ACTION

1. Claims 1-9, 12-14 are presented for examination.

#### Claim Objections

2. Claims 5-9, 12-14 are objected to because of the following informalities: the Examiner is not clear about the meaning of the claim. "...corresponding."

Appropriate correction is required.

#### Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which the subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 1-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Rochberger (U.S. Patent 6,396,841) in view of Lynch et al. (U.S. Patent 5,0956,458).

As to Claims 1, 5 and 12, Rochberger discloses a method comprising:

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assigning a number to a symbol in a key comprising a string of symbols (Rochberger col. 14, lines 6-30 and fig. 10-11); and

storing an entry for the key in a level of nodes (Fig. 6, col. 9, lines 19-26) of a multiway radix tree based at least in part on the number instead of on a path between nodes representing every symbol in the key (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

Rochberger does not explicitly teach a logical level.

Lynch et al. teaches logical level (Lynch et al. col. 8, lines 10-18).

Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rochberger with logical level.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to have modified Rochberger by the teaching of Lynch et al. because providing the logical level allows the prevention of trees becoming large and inefficient as taught by Lynch et al. (col. 3, lines 34-45).

As to Claim 2, Rochberger as modified teaches a method, wherein the data structure is comprised of levels of nodes

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arranged according to ascending magnitude of logical level numbers assigned to the levels of nodes (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

As to Claim 3, Rochberger as modified teaches a method, wherein a minimum number of symbols of the key are used to differentiate the key from other keys stored on the tree, and the data structure has only levels of nodes for the symbols of the key that are used to differentiate the key from other keys stored on the tree (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

As to Claim 4, Rochberger as modified teaches a method, wherein a search for the key uses the logical level number corresponding to a length of the key to find the level of nodes storing the key (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

As to Claim 6, Rochberger as modified teaches a method, further comprising assigning a first logical level value of one, corresponding to the first symbol in the key, to the logical level number for the first level of nodes (Rochberger col. 11,

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lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42); and

assigning a second logical level value of  $n$  to the logical level number for the second level of nodes corresponding to the last symbol in the key, wherein  $n$  equals the number of symbols in the key (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

As to Claim 7, Rochberger as modified teaches a method, wherein a new level of nodes to store an entry for a new key in a node corresponding to the last symbol in the new key is added to and/or inserted between the existing levels of nodes in the tree based on ordering all the levels of nodes in the tree in sequence according to ascending logical level numbers (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

As to Claim 8, Rochberger as modified teaches a method, further comprising rearranging pointers that exist between a parent level of nodes and a child level of nodes when a level of nodes having a logical level number between the logical level numbers of the parent level of nodes and the child level of nodes is inserted between the parent level of nodes and the

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child level of nodes (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

As to Claim 13, Rochberger as modified teaches a apparatus, further comprising:

a receiver to receive keys; and an inserter to insert an entry for each key to be stored into the node created by the node generator. (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

As to Claim 14, Rochberger as modified teaches a apparatus of claim 12, further comprising: a finder to:

follow a pointer to a node corresponding to the first symbol of the key being searched for;

search the node corresponding to the first symbol of the key for a pointer to a level of nodes having the logical level number as the key being searched for; and

search for an entry for the key on the level of nodes having the logical level number of the key being searched for. (Rochberger col. 11, lines 58-67, col. 14, lines 6-30 and fig. 10-11, and col. 12, lines 25-42).

**Allowable subject Matter**

5. Claim 9 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

6. The following is a statement of reasons for the indication of allowable subject matter:

The prior art of record (Rochberger (U.S. Patent 6,396,841) in view of Lynch et al. (U.S. Patent 5,0956,458).

does not disclose, teach or suggest the claimed limitations of (in combination with all other features in the claims):

as the number of logical levels between nodes representing a first symbol in the key and a last symbol in the key changes, as claimed in claim 9.

**Prior Art Made of Record**

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Stone (U.S. Patent No. 5,546,390);

Angle et al. (U.S. Patent No. 5,873,078);

Calvignac et al. (U.S. Patent No. 6,298,340).



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Conclusion

8. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Yicun Wu whose telephone number is 703-305-4889. The examiner can normally be reached on 8:00 am to 4:30 pm, Monday -Friday. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Dov Popovici can be reached on 703-305-3830. The fax phone numbers for the organization where this application or proceeding is assigned are 703-872-9306 for regular communications and 703-746-7240 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Yicun Wu  
Patent Examiner  
Technology Center 2100

May 12, 2004

DIANE D. MIZRAHI  
PRIMARY PATENT EXAMINER  
TECHNOLOGY CENTER 2100